

# Status Epilepticus \*in children over 1 month of age

Status Epilepticus is a time-sensitive emergency, since untreated seizures lead to more seizures and delayed treatment contributes to morbidity and mortality.<sup>1</sup> Providing sufficient evidence-based treatment early is essential to improve patient outcomes. If your patient is actively seizing, refer to [TREKK and EIC's Status Epilepticus Algorithm](#).

## Making the Diagnosis

- Seizures lasting longer than 5 minutes or multiple seizures without full recovery of consciousness between seizures warrant treatment as status epilepticus.
- To determine the underlying cause and manage concurrently, consider the following investigations, depending on the clinical situation:
  - Electrolytes, glucose, urea, creatinine, CBC, blood/urine cultures, blood gas, LFTs and/or drug screen.
  - Anti-convulsant levels if patient on treatment (e.g., phenytoin, carbamazepine, phenobarbital, valproic acid).
  - Head CT if history of trauma, signs of increased intracranial pressure, and/or focal neurological signs.
  - Lumbar puncture (LP) if suspicion for meningitis AND no focal neurologic findings on exam or contraindications to LP on imaging. Initiation of antimicrobials should **NOT** be delayed if LP is not possible.

## Possible Etiologies

- Fever, severe infection (meningitis, encephalitis), anoxic injury, hypo/hyperglycemia, hypo/hyponatremia, hypo/hypercalcemia, traumatic brain injury, anti-epileptic drug non-adherence/withdrawal/overdose, toxic exposure, structural brain abnormality, hypoxic-ischemic encephalopathy, progressive neurodegenerative disorder, stroke, underlying genetic condition.

## Management

### PHASE 0 (GOAL 0-5 MINUTES)

- Maintain airway (suction secretions, position, jaw thrust), breathing (100% oxygen via non-rebreather mask +/- assisted ventilation), and circulation (monitor, IV access, isotonic fluid bolus if inadequate perfusion).


### PHASE 1 (GOAL 5-15 MINUTES)

#### PREHOSPITAL<sup>2</sup>

- **DO NOT** wait to check blood glucose before initiating treatment or placing an IV/IO.
- Give Midazolam 0.2 mg/kg/dose IM/intranasal (MAX 10 mg/dose)
  - Consider standardized Midazolam dose: 5 mg/dose for 13-40 kg; 10 mg/dose for >40 kg via IM/intranasal route.
- **Check blood glucose:**
  - **If blood glucose <3.3 mmol/L (<60 mg/dL):** Treat with D25W 2 mL/kg/dose IV (MAX 100 mL/dose) OR D10W 5 mL/kg/dose IV (MAX 250 mL/dose).
  - **If ≥3.3 mmol/L (≥60 mg/dL):** Give second dose of Midazolam 0.2 mg/kg/dose IM/intranasal (MAX cumulative dose of 10 mg in prehospital setting; if max dose given, consult Medical Director/Base Hospital for next step).

#### EMERGENCY DEPARTMENT<sup>3</sup>

- Give a benzodiazepine (if two doses not already given prior to ED arrival):
  - IV/IO Access:
    - Lorazepam 0.1 mg/kg/dose IV/IO (MAX 4 mg/dose) OR
    - Midazolam 0.1 mg/kg/dose IV/IO (MAX 10 mg/dose)
  - No IV/IO Access:
    - Midazolam 0.2 mg/kg/dose IM/intranasal (MAX 10 mg/dose)
    - Consider standardized Midazolam dose: 5 mg/dose for 13-40 kg; 10 mg/dose for >40 kg via IM/intranasal route.
- Check blood glucose and respond as per Prehospital section above (if not already done prior to ED arrival).
- Give a second benzodiazepine dose for ongoing seizures 5 minutes after the first dose.

- If IV/IO access becomes available, switch to IV/IO route.
-  **DO NOT** give more than two doses of benzodiazepine due to increased risk of apnea.

### PHASE 2 (GOAL 15-50 MINUTES)

- Levetiracetam, Phenytoin/Fosphenytoin and Valproic acid are equally efficacious for status epilepticus.<sup>4</sup> If available, Levetiracetam is preferred given rapid administration, favourable side effect profile, and fewer drug interactions.

Drug	Dose	Age	Comments/Cautions
Levetiracetam	60 mg/kg/dose IV/IO (MAX 3000 mg/dose) Infuse over 5 minutes	Any age <sup>4</sup>	↓side effects/drug interactions, low risk of psychosis
Fosphenytoin	20 mg phenytoin equivalent (PE)/kg/dose IV/IO/IM (MAX 1000 mg PE/dose) Infuse over 10 minutes	Any age	↓BP, ↓HR, arrhythmia; avoid in toxicologic seizures; choose alternate drug if on phenytoin at home or consider partial loading dose of 10 mg PE/kg/dose
Valproic Acid	40 mg/kg/dose IV/IO (MAX 3000 mg/dose) Infuse over 10 minutes	≥2 years <sup>4</sup>	In Canada, only available via Health Canada Special Access Program; caution in patients with liver dysfunction, mitochondrial disease, urea disorder, thrombocytopenia or unexplained developmental delay
Phenytoin	20 mg/kg/dose IV/IO (MAX 1000 mg/dose) <b>Infuse over 20 minutes</b>	Any age	↓BP, ↓HR, arrhythmia; avoid in toxicologic seizures; choose alternate drug if on phenytoin at home or consider partial loading dose of 10 mg kg/dose; use only if Fosphenytoin not available
Phenobarbital	20 mg/kg/dose IV/IO (MAX 1000 mg/dose) <b>Infuse over 20 minutes</b>	<6 mos <sup>1</sup>	Respiratory depression, especially in combination with benzodiazepines

 **DO NOT combine Phenytoin and Fosphenytoin.**

**IF PATIENT IS STILL SEIZING 5 MINUTES AFTER END OF MEDICATION INFUSION, CHOOSE A DIFFERENT SECOND-LINE AGENT FROM THIS LIST TO GIVE NEXT. CONTACT PEDIATRIC REFERRAL SITE.**

### PHASE 3 (GOAL 50 MINUTES ONWARDS)

- If two second-line therapies fail, discuss further management with Pediatric Referral Site.
- Anticipate the need/prepare for definitive airway support due to the risk of apnea.
- Third-line therapy consists of continuous IV infusion of Midazolam, Pentobarbital, Propofol OR Ketamine.<sup>5</sup>

### MONITORING

- Monitor heart rhythm, pulse oximetry, and blood pressure.
- Anticipate apnea and/or hypotension with the use of multiple medications.
- Neurology consult, continuous electroencephalogram (EEG) monitoring +/- video should be initiated (at Pediatric Referral Site) as soon as feasible for patients on continuous infusion or those with persistent altered mental status, need for pharmacological paralysis, and/or paroxysmal events suspected to be seizures.<sup>6</sup>

### CRITERIA FOR ADMISSION/TRANSFER TO PEDIATRIC REFERRAL SITE

- Patients with refractory seizures or who are not awake and responsive within 4-6 hours of ED arrival should be admitted/ transferred for further evaluation and/or monitoring.

### CONSIDERATIONS FOR DISCHARGE HOME

- Discharge home may be considered in patients who have returned to baseline post seizure management in discussion with Pediatric Referral Site, taking into account parental comfort.
- Counsel parents/guardians on what to do if a seizure recurs at home using this resource ([Eng/Esp](#)) or this resource ([Eng/Fr](#)).

*Scan or click the QR code to learn more and to see a full list of references and development team members*

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